a.) Amendments to Specification

Replace the paragraph beginning at page 2, paragraph [07], in the specification as originally filed, with the following rewritten paragraph:

-- The invention has the advantage that a computer system is provided which determines the calculation of statistical signatures of a recorded multi-dimensional image. These signatures result from projection of the grayscale values based on the inherent axes of the image (X, Y, Z, lambda). In addition, a means for calculating statistical signature parameters is provided. It is especially advantageous that several positioning motors and/or actuators are provided on or in the microscope system, and that at least one software module is implemented that supplies to the positioning motors or actuators control signals which can be ascertained from the signature parameters. It is thereby possible to guarantee that, for example, a specimen element that is to be observed is always in the optimum image window regardless of its motion. A corresponding displacement of the XYZ stage is then performed for this purpose, the positioning signals being derived from the statistical signatures and the statistical parameters. It is likewise conceivable for the wavelength of the fluorescent light proceeding from an element of the specimen to change. A suitable displacement at the SP (spectral photometer) module of the microscope system would be necessary for this purpose. –

Replace the paragraph beginning at page 3, paragraph [10], in the specification as originally filed, with the following rewritten paragraph:

--FIG. 1 schematically shows an exemplary embodiment of a confocal scanning microscope 100. This is not intended, however, to be construed as a limitation of the invention. Illuminating light beam 3 coming from at least one illumination system 1 is directed by a beam splitter or a suitable deflection means 5 to a scanning module 7. Before illuminating light beam 3 strikes deflection means 5, it passes through an illumination pinhole 6. Scanning module 7 encompasses a gimbal-mounted scanning mirror 9 that guides illuminating light beam 3, through a scanning optical system 12 and a microscope optical system 13, over or through a specimen 15. Illumination system 1 can be configured in such a way that it generates white light from the light of a laser 10. A microstructured element 8 or a tapered glass fiber is provided for this purpose. For biological specimens 15 (preparations) or transparent specimens, illuminating light beam 3 can also be guided through specimen 15. For these purposes, non-luminous specimens are, if applicable, prepared with a suitable dye and often also with several dyes (not depicted, since established existing art). The dyes present in specimen 15 are excited by illuminating light beam 3 and emit light in a characteristic region of the spectrum peculiar to them. This light proceeding from specimen 15 defines a detected light beam 17. Detected light beam 17 travels to a detector module 22. Detected light beam 17 travels through microscope optical system 13 and scanning optical system 12 and via scanning module 7 to deflection means 5, passes through the latter, and travels to detector module 22. Through a detection pinhole 18, it strikes at least one detector 36, 37 embodied respectively as a photomultiplier. It is evident to one skilled in the art that other detection components, for example diodes, diode arrays, photomultiplier arrays, CCD chips, or CMOS image sensors, can also be used. Detected light beam 17 proceeding from or defined by specimen 15 is depicted in FIG. 1 as a dashed line. In detectors 36, 37, electrical detected signals proportional to the power level of the light proceeding from specimen 15 are generated. Since, as already mentioned above, light of not only one wavelength is emitted from specimen 15, it is useful to provide an SP module 20 in front of the at least one detector 36, 37. The data generated by the at least one detector 36, 37 are delivered to a computer system 23. At least one peripheral 27 is associated with computer system 23. Peripheral 27 can be, for example, a display on which the user receives instructions for setting scanning microscope 100, or can view the current setup and also the image data in graphical form. Also associated with computer system 23 is an input means ~~28~~ that comprises, for example, a keyboard, an adjusting apparatus for the components of the microscope system, and/or a mouse ~~30~~. A memory 24, in which the signatures are stored as data sets, is likewise associated with computer system 23. Additionally implemented in computer system 23 is a software program 25 with which the appropriate calculations for the method according to the invention can be carried out. Setting elements 40, 41 for image recording are additionally depicted on display 27. In the embodiment shown here, setting elements 40, 41 are depicted as sliders. Setting elements 40, 41 can also be embodied as check boxes which make possible yes/no activation for specific parameters. Any other embodiment lies within the specialized ability of one skilled in the art.--

Replace the paragraph beginning at page 6, paragraph [13], in the specification as originally filed, with the following rewritten paragraph:

-- As already mentioned above, the recorded image can be two-dimensional, three-dimensional, four-dimensional, etc. depending on the measurement metbod selected. A three-dimensional image comprises, for example, the X coordinate x_M, the Y coordinate y_N, and an intensity I_{MN} for the intensity measured at the particular pixel. It is self-evident that the image of specimen 15 can be assembled from multiple degrees of freedom of the system (e.g. X, Y, Z, wavelength, intensity, etc.). The degrees of freedom are referred to as axes of the image. FIG. 3 depicts a three-dimensional image reproducing the X axis x, Y axis y, and intensity I at each pixel x_M, y_N. A projection can be calculated for the schematic depiction of the image in FIG. 3; in other words, for example, for all discrete coordinates of the X axis, all pixels of the image that have the same coefficient for that coordinate are totaled. The sum of all intensities is therefore created. This yields a distribution function 60 that says something about the compactness of the image scene. This calculation step can be performed efficiently, for example, by means of FPGAs (field programmable gate arrays) or DSPs (digital signal processors). This distribution function 60 can be described relatively easily using descriptive statistical parameters, for example mean, variance, higher statistical moments, minimum and maximum, median, or statistical quartiles. Any parameter for the description of statistical distributions and distribution density functions can be used, in this context, to quantify changes. If the variance on X axis x changes between images this means, if the variance becomes smaller, a concentration of pixels, which is an indication to make the image format smaller; if it becomes greater, this is an indication to enlarge the image format. If the mean or one of the boundary quartiles changes, this is an indication that a moving specimen is present. If the variance remains unchanged (within certain limits), a moving object is often present. The same method or classification can also be used for the Y axis and Z axis. It should be noted in this context that a great many different arguments and control protocols can be constructed from different statistical parameters. This topic will be returned to later when inference is discussed.--

Replace the paragraph beginning at page 7, paragraph [15], in the specification as originally filed, with the following rewritten paragraph:

-- FIG. 4 graphically depicts projections, at different times, of intensity values each having identical coefficients of a coordinate. At a time T_1, image 50_1 of specimen 15 is recorded, and distribution function 60_1 referring to X axis x, and a distribution function 61_1 referring to the Y axis, are ascertained. Specimen 15 contains, for example a first and a second element 58, 59. In distribution function 60_1 referring to the X axis, locations 74, 75 of first and second element 58, 59 are ascertained. In distribution function 61_1 referring to the Y axis, locations ~~77~~, 78 of first and second element 58, 59 are likewise ascertained. At a time T_2, image 50_2 of specimen 15 is recorded, and distribution function 60_2 referring to X axis x, and a distribution function 61_2 referring to the Y axis, are determined. For first and second element 58, 59 present in specimen 15, locations 74, 75 of first and second element 58, 59 with reference to the X axis are ascertained from distribution function 60_2. Similarly, the locations 78, 79 of first and second element 58, 59 with reference to the Y axis are ascertained from distribution function 61_2. From a comparison of locations 74, 75, 78, and 79, conclusions can be drawn as to the changes in first and second element 58, 59. In the example depicted in FIG. 4, for element 58 there is an increase in size with no change in location. For second element 59, a change in location is determined. Scanning microscope 100 can now be adjusted correspondingly for second element 59 so that element 59 is always at the center of an image window (not depicted).--